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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/566,633	01/31/2006	Katsuo Kazahaya	0523630031	7544
20277 7590 01/15/2010 MCDERMOTT WILL & EMERY LLP 600 13TH STREET, N.W. WASHINGTON, DC 20005-3096				
EXAMINER				
MILLER, DANIEL H				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/566,633

Applicant(s)

KAZAHAYA ET AL.

Examiner

DANIEL MILLER

Art Unit

1794

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 June 2009.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 5-20 is/are pending in the application.
4a) Of the above claim(s) 17-20 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-3 and 5-16 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-850)
Paper No(s)/Mail Date 9/23/2009 and 11/10/2009
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 5-8, 14 and 16 are rejected under 35 U.S.C. 103(a) as obvious over Phillips (US 5,571,615) in view of Tribochemistry Between Hydrogen and Diamond Like Carbon Films, Fontaine; Surface and Coating Technology 146-147 (2001) 286-291 (as evidence of effect of Hydrogen on diamond film structures).

Phillips teaches a cement carbide substrate having a diamond film coating having a grain size of less than about 0.5 microns; within applicant's claimed range (abstract, and claim 2). The diamond coating has a thickness of greater than about 10 micrometers (column 4 lines 50-60). The reference discloses a superior smooth surface (see comments on figures), but does not specifically disclose the claimed surface roughness. However, given that the diamond film has a substantially similar thickness and grain size and is produced via CVD methods, similar to applicant's disclosed method, therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to provide a low surface roughness diamond film by employing known processing conditions for diamond films in order to obtain a surface roughness

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as low as possible; including a surface roughness less than 0.2 microns, as claimed, since a smooth diamond surface is highly desired by Phillips.

Regarding claims 2-8 and 14 and 16, Phillips discloses a superior smooth surface (see comments on figures) produced via a CVD process, but does not specifically disclose the claimed surface roughness. However, given that the diamond film has a substantially similar thickness and grain size and is produced via CVD methods, similar to applicant's disclosed method (see embodiments in the instant specification); the diamond film would be expected by one of ordinary skill to be optimizable for surface smoothness and evenness (and would be expected to obtain similar aspect ratios given similar grain sizes) in so doing achieve substantially similar physical properties and characteristics as claimed. It is not clear that there are any processing conditions that are different between Phillips and the instant claimed invention that would produce differing characteristics.

More specifically regarding claim 16, it is not clear that the further defined process produce a distinctly different product given the instant disclosure and the art of record, therefore the process limitation is not considered to produce a distinct product further defining the claimed product.

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide a diamond film of the claimed crystal structures and orientation known in the art which have high aspect ratio within applicant's claimed range (i.e. columnar structures having high aspect ratios). It further would have been obvious to provide any desired thickness including a single crystal thicknesses, and an optimized

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hydrogen content by varying the processing time and other processing conditions (i.e. pressure; as taught by Phillip see column 4 regarding CVD processing) in order to obtain a diamond film ideal for particular applications limiting the hydrogen content, consistent with hydrogen contents known effect on the physical properties of the diamond film (see *Tribochemistry Between Hydrogen and Diamond Like Carbon Films*, Fontaine; *Surface and Coating Technology* 146-147 (2001) 286-291 as evidence of effect of Hydrogen on diamond film structures). No patentable distinction is seen.

Regarding applicant's amendments to claims, it is noted that applicant has not defined primary and secondary grain structures. Further there is no requirement that the two claimed grain structures are different in any way nor is it clear that there is any nexus between the added claim language and the Raman Spectroscopy results and "double crystal structure" as defined by applicant's affidavit after the filing of the instant application. Phillips has multiple diamond grain structures that can be considered primary and secondary grain structures. No patentable distinction is seen.

Claims 9-13, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Phillips (US 5,571,615), in view of *Tribochemistry Between Hydrogen and Diamond Like Carbon Films*, Fontaine; *Surface and Coating Technology* 146-147 (2001) 286-291 as evidence of effect of Hydrogen on diamond film structures), further in view of Kembaiyan et al (US 2004/0060742).

Phillips teaches a cement carbide substrate having a diamond film coating having a grain size of less than about 0.5 microns; within applicant's claimed range (abstract, and claim 2). The diamond coating has a thickness of greater than about 10 micrometers (column 4 lines 50-60). The reference discloses a superior smooth surface (see comments on figures), but does not specifically disclose the claimed surface roughness. However, given that the diamond film has a substantially similar thickness and grain size and is produced via CVD methods, similar to applicant's disclosed method, therefore would be expected to have substantially similar surface roughness.

Kembaiyan teaches a tungsten carbide body containing cobalt and chromium binder material [0023]. Further, the carbide body has a diamond layered face covering the body [0025]. The Cobalt binder can be present between 2% and 12% of the body (see claim 10 ref.); overlapping applicant's claimed range. The tungsten carbide is present at least 80% of the body in some embodiments and from 30% to 99% dependent upon the embodiment (see claims 2 and 25-27 ref). Therefore, the disclosed ranges overlap applicant's claimed ranges of each material.

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide a carbide body, as taught by Kembaiyan, and optimize the level of cobalt and chromium binder within the ranges disclosed by Kembaiyan (above) to within the corresponding levels claimed by applicant in order to provide the most effective tool body having the most advantageous physical characteristics (i.e hardness and wear resistance).

Response to Arguments

2. Applicant's arguments filed 10/2/2009 have been fully considered but they are not persuasive.
3. The 102 rejection has been withdrawn due to attorney argument and the affidavit of 5/20/2009 and considered initially on 7/2/2009. The affidavit seems to establish a difference between the two crystals with regards to there spectroscopic analysis. It appears that applicant has established what he is defining as a "double crystal structure" structure in the affidavit that is not present within the Phillips reference. However, applicant is not claiming a crystal structure with a particular Raman spectroscopy or a "double crystal structure" structure, nor is it clear applicant would have support for such claims.
4. Applicant's new arguments of 10/2/2009 and affidavit of 5/20/2009 are still not commensurate in scope with the pending claims. Applicant has still not claimed a "double crystal structure" but has instead claimed a "aggregation of diamond fine grains" and it is not clear that the two are the same or that they even encompass overlapping structures. While it may be that there are some differences between the disclosed structure and the art of record, it is not clear that there is a difference between the scope of the claimed structure and the art of record. Applicant has not clearly established a difference. For instance, claim 8 claims a diamond coating "formed as a single layer" and it is not clear how this corresponds with applicant's description of the

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layer as a "double crystal structure" since the two terms appear to be mutually exclusive.

5. Regarding applicant's amendments to claims, it is noted that applicant has not defined primary and secondary grain structures. Further there is no requirement that the two claimed grain structures are different in any way nor is it clear that there is any nexus between the added claim language and the Raman Spectroscopy results and "double crystal structure" as defined by applicant's affidavit after the filing of the instant application. Phillips has multiple diamond grain structures that can be considered primary and secondary grain structures. No patentable distinction is seen.

6. Applicant is encouraged to request an interview if they believe an alternative interpretation of the claims is warranted. The examiner would be happy to grant any interview requests.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL MILLER whose telephone number is (571)272-1534. The examiner can normally be reached on M-Th.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Sample can be reached on (571)272-1376. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David R. Sample/
Supervisory Patent Examiner, Art Unit 1794

/Daniel Miller/
Examiner, Art Unit 1794